

# LH531000B

CMOS 1M (128K × 8) MROM

## FEATURES

- 131,072 words × 8 bit organization
- Access time: 150 ns (MAX.)
- Low power consumption:
  - Operating: 192.5 mW (MAX.)
  - Standby: 550 μW (MAX.)
- Programmable  $\overline{CE}/\overline{OE}/\overline{OE}$
- Static operation
- TTL compatible I/O
- Three-state outputs
- Single +5 V power supply
- Packages:
  - 28-pin, 600-mil DIP
  - 28-pin, 450-mil SOP
- Mask ROM specific pinout

## DESCRIPTION

The LH531000B is a mask-programmable ROM organized as 131,072 × 8 bits. It is fabricated using silicon-gate CMOS process technology.

## PIN CONNECTIONS

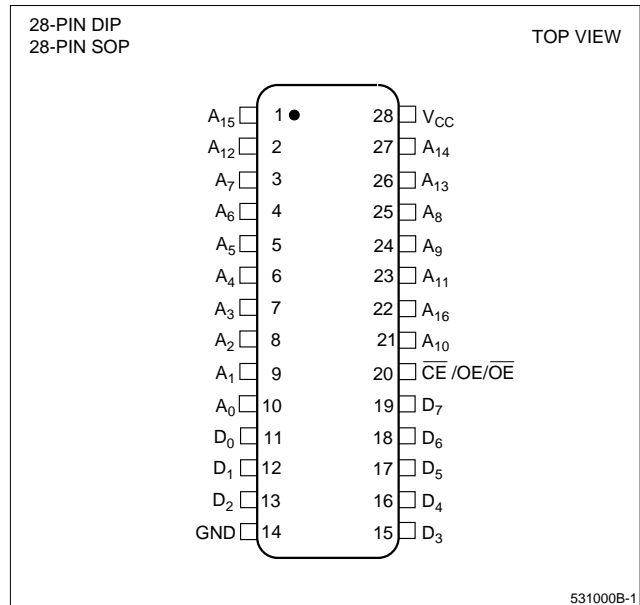
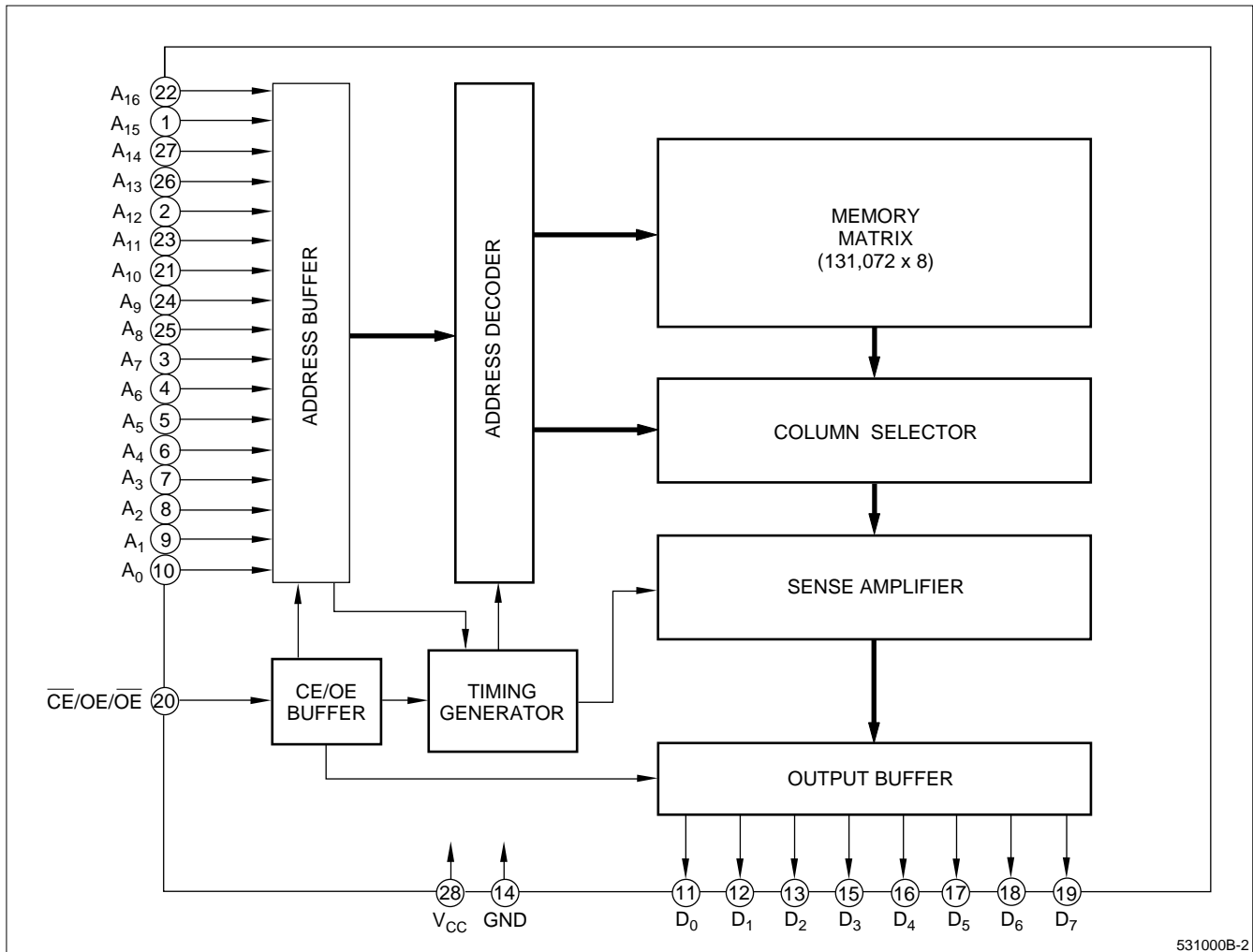


Figure 1. Pin Connections for DIP and SOP Packages



531000B-2

Figure 2. LH531000B Block Diagram

**PIN DESCRIPTION**

| SIGNAL                           | PIN NAME                                 | NOTE |
|----------------------------------|--|------|
| A <sub>0</sub> - A <sub>16</sub> | Address input                            |      |
| D <sub>0</sub> - D <sub>7</sub>  | Data output                              |      |
| $\overline{CE/OE/OE}$            | Chip Enable input or Output Enable input | 1    |

| SIGNAL          | PIN NAME            | NOTE |
|-----------------|---------------------|------|
| V <sub>CC</sub> | Power supply (+5 V) |      |
| GND             | Ground              |      |

**NOTE:**

- Active level of  $\overline{CE/OE/OE}$  is mask-programmable.

**TRUTH TABLE**

| PIN 20  | $\overline{CE}$ | $OE/\overline{OE}$ | MODE         | D <sub>0</sub> - D <sub>7</sub> | SUPPLY CURRENT               |
|---------|-----------------|--------------------|--------------|---------------------------------|------------------------------|
| CE type | L               | –                  | Selected     | DOUT                            | Operating (I <sub>CC</sub> ) |
|         | H               | –                  | Non selected | High-Z                          | Standby (I <sub>SB</sub> )   |
| OE type | –               | H/L                | Selected     | DOUT                            | Operating (I <sub>CC</sub> ) |
|         | –               | L/H                | Non selected | High-Z                          |                              |

**ABSOLUTE MAXIMUM RATINGS**

| PARAMETER             | SYMBOL    | RATING                 | UNIT |
|-----------------------|-----------|------------------------|------|
| Supply voltage        | $V_{CC}$  | -0.3 to +7.0           | V    |
| Input voltage         | $V_{IN}$  | -0.3 to $V_{CC} + 0.3$ | V    |
| Output voltage        | $V_{OUT}$ | -0.3 to $V_{CC} + 0.3$ | V    |
| Operating temperature | $T_{opr}$ | 0 to +70               | °C   |
| Storage temperature   | $T_{stg}$ | -65 to +150            | °C   |

**RECOMMENDED OPERATING CONDITIONS ( $T_A = 0$  to +70°C)**

| PARAMETER      | SYMBOL   | MIN. | TYP. | MAX. | UNIT |
|----------------|----------|------|------|------|------|
| Supply voltage | $V_{CC}$ | 4.5  | 5.0  | 5.5  | V    |

**DC CHARACTERISTICS ( $V_{CC} = 5\text{ V} \pm 10\%$ ,  $T_A = 0$  to +70°C)**

| PARAMETER              | SYMBOL     | CONDITIONS                         | MIN. | TYP. | MAX.           | UNIT          | NOTE |
|------------------------|------------|------------------------------------|------|------|----------------|---------------|------|
| Input 'Low' voltage    | $V_{IL}$   |                                    | -0.3 |      | 0.8            | V             |      |
| Input 'High' voltage   | $V_{IH}$   |                                    | 2.2  |      | $V_{CC} + 0.3$ | V             |      |
| Output 'Low' voltage   | $V_{OL}$   | $I_{OL} = 2.0\text{ mA}$           |      |      | 0.4            | V             |      |
| Output 'High' voltage  | $V_{OH}$   | $I_{OH} = -400\text{ }\mu\text{A}$ | 2.4  |      |                | V             |      |
| Input leakage current  | $ I_{LI} $ | $V_{IN} = 0\text{ V to }V_{CC}$    |      |      | 10             | $\mu\text{A}$ |      |
| Output leakage current | $ I_{LO} $ | $V_{OUT} = 0\text{ V to }V_{CC}$   |      |      | 10             | $\mu\text{A}$ | 1    |
| Operating current      | $I_{CC1}$  | $t_{RC} = 150\text{ ns}$           |      |      | 35             | mA            | 2    |
|                        | $I_{CC2}$  | $t_{RC} = 1\text{ }\mu\text{s}$    |      |      | 25             |               |      |
|                        | $I_{CC3}$  | $t_{RC} = 150\text{ ns}$           |      |      | 30             | mA            | 3    |
|                        | $I_{CC4}$  | $t_{RC} = 1\text{ }\mu\text{s}$    |      |      | 20             |               |      |
| Standby current        | $I_{SB1}$  | $CE = V_{IH}$                      |      |      | 2              | mA            |      |
|                        | $I_{SB2}$  | $CE = V_{CC} - 0.2\text{ V}$       |      |      | 100            | $\mu\text{A}$ |      |
| Input capacitance      | $C_{IN}$   | $f = 1\text{ MHz}$                 |      |      | 10             | pF            |      |
| Output capacitance     | $C_{OUT}$  | $T_A = 25^\circ\text{C}$           |      |      | 10             | pF            |      |

**NOTES:**

- $CE/OE = V_{IH}$ ,  $OE = V_{IL}$
- $V_{IN} = V_{IH}$  or  $V_{IL}$ ,  $CE = V_{IL}$ , outputs open
- $V_{IN} = (V_{CC} - 0.2\text{ V})$  or  $0.2\text{ V}$ ,  $CE = 0.2\text{ V}$ , outputs open

**AC CHARACTERISTICS ( $V_{CC} = 5\text{ V} \pm 10\%$ ,  $T_A = 0$  to +70°C)**

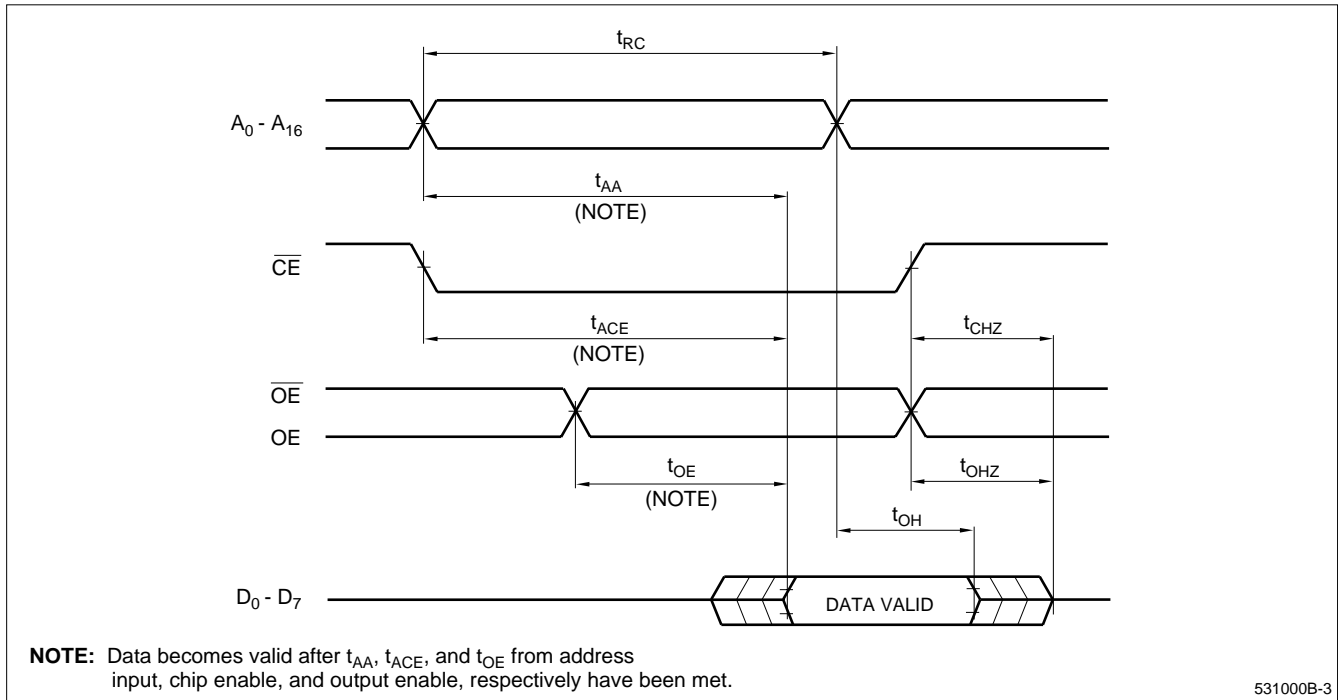
| PARAMETER               | SYMBOL    | MIN. | TYP. | MAX. | UNIT | NOTE |
|-------------------------|-----------|------|------|------|------|------|
| Read cycle time         | $t_{RC}$  | 150  |      |      | ns   |      |
| Address access time     | $t_{AA}$  |      |      | 150  | ns   |      |
| Chip enable access time | $t_{ACE}$ |      |      | 150  | ns   |      |
| Output enable time      | $t_{OE}$  |      |      | 70   | ns   |      |
| Output hold time        | $t_{OH}$  | 5    |      |      | ns   |      |
| CE to output in High-Z  | $t_{CHZ}$ |      |      | 70   | ns   | 1    |
| OE to output in High-Z  | $t_{OHZ}$ |      |      | 70   | ns   |      |

**NOTE:**

- This is the time required for the output to become high-impedance.

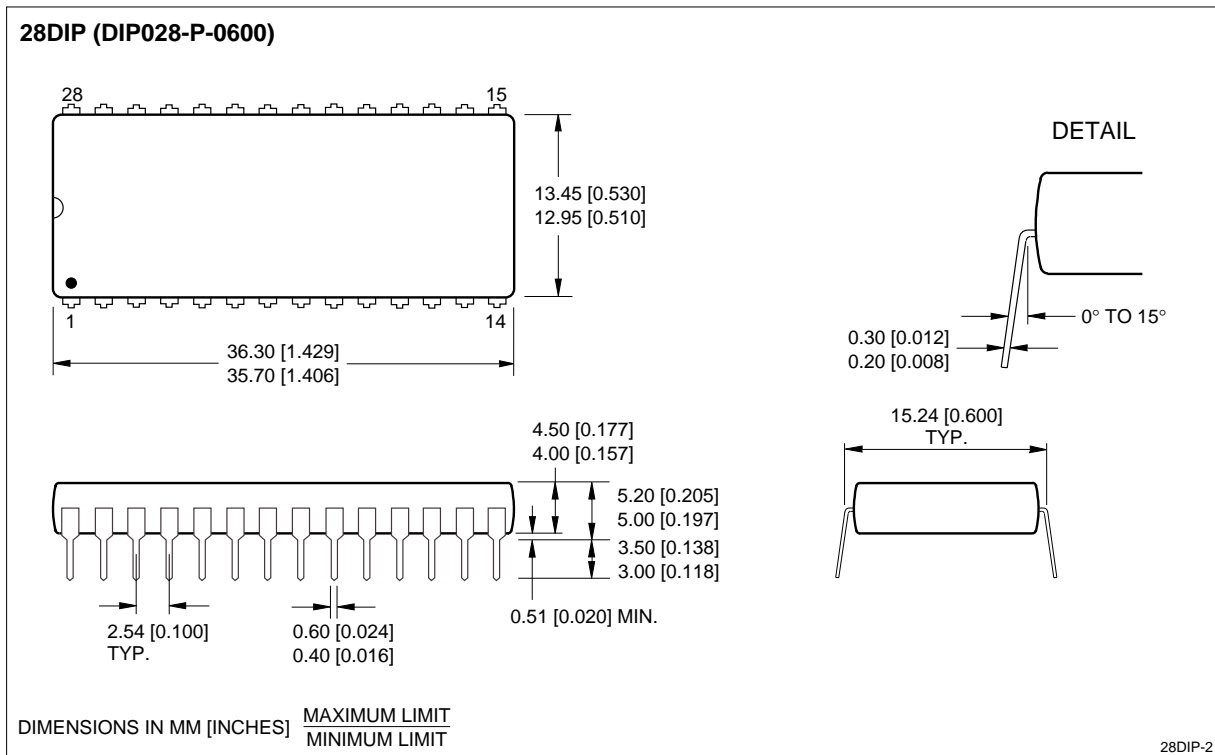
**AC TEST CONDITIONS**

| PARAMETER               | RATING          |
|-------------------------|-----------------|
| Input voltage amplitude | 0.6 V to 2.4 V  |
| Input rise/fall time    | 10 ns           |
| Input reference level   | 1.5 V           |
| Output reference level  | 0.8 V and 2.2 V |
| Output load condition   | 1TTL +100 pF    |

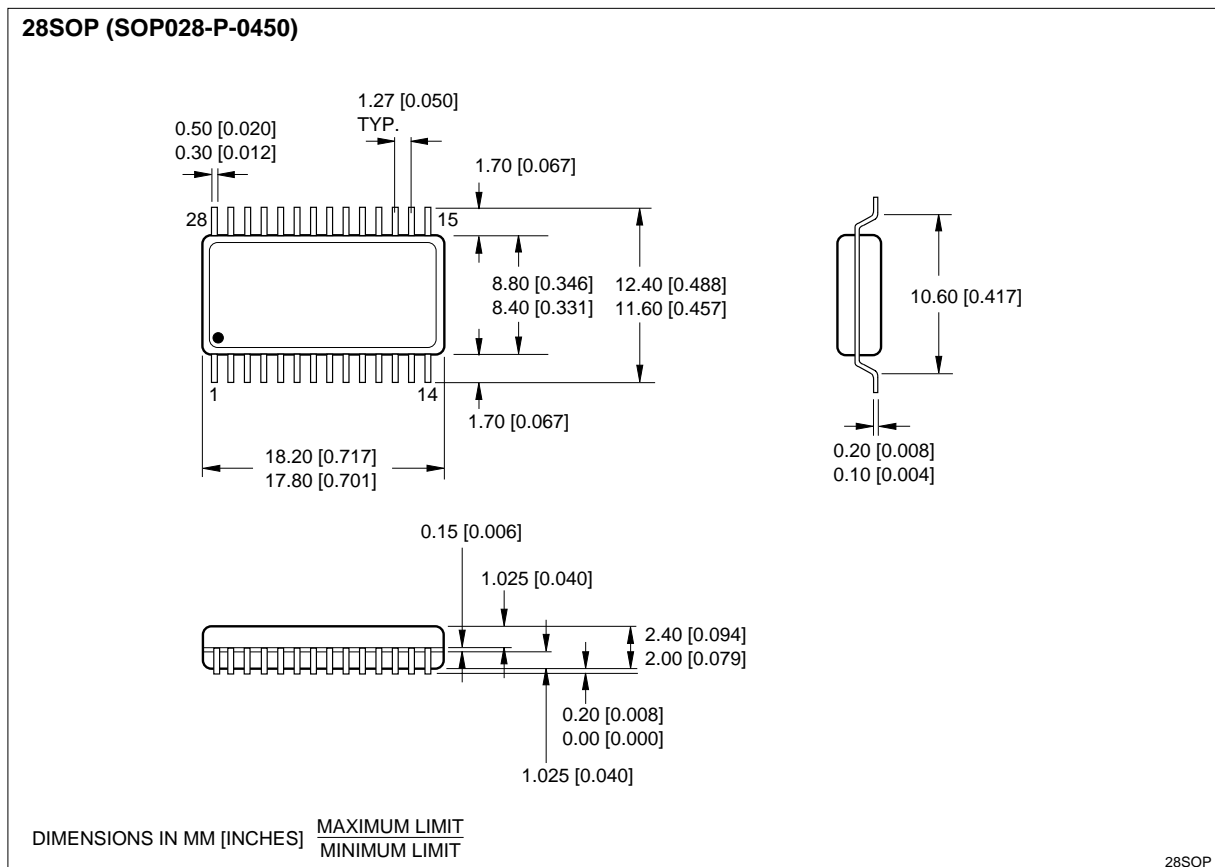


**Figure 3. Timing Diagram**

PACKAGE DIAGRAMS



28-pin, 600-mil DIP



28-pin, 450-mil SOP

## ORDERING INFORMATION

